

assist (URPA) system under this condition.

In order to enter the diagnostic mode, complete the following actions:

1. With the ignition turned OFF, short the rear parking assist diagnostic connector to ground while the vehicle is in PARK. Refer to **Component Connector End Views** for the location of the rear parking assist diagnostic connector.
2. Turn the ignition ON.
3. Place your foot on the brake.
4. Shift the vehicle into REVERSE within 5 seconds.

If the vehicle is not shifted into reverse within 5 seconds after turning the ignition ON, the diagnostic mode will still be initiated. However, a reverse input wiring fault will be registered as sequence #7 as shown in the Diagnostic Indicator table below. Refer to **Diagnostic Trouble Code (DTC) Clearing** for specific steps on how to clear DTCs. After the reverse input wiring code is cleared, repeat the DTC displaying steps in order to enter the diagnostic mode.

When the diagnostic mode is first entered, the rear parking assist display displays the amber outside indicator and the red outside indicator. Then the indicators on the rear parking assist display will display one or more of the sequences in the table below to indicate where the fault exists within the rear parking assist system. Refer to **Diagnostic Trouble Code (DTC) Clearing** for the specific steps on how to clear diagnostic trouble codes.

Diagnostic Indicators

#	State/Fault Location	Amber Outside	Amber Middle	Red Outside	Flashing
1	Start of Diagnostics	X	-	X	-
2	RR Corner Object Sensor and Wiring	X	-	-	-
3	RR Middle Object Sensor and Wiring	X	X	-	-
4	LR Middle Object Sensor and Wiring	-	X	X	-
5	LR Corner Object Sensor and Wiring	-	-	X	-
6	Chime Warning Wiring	-	X	-	-
7	Reverse Input Wiring	-	X	-	X
8	IMPORTANT: This diagnostic pattern sets for an open sensor supply voltage circuit and sensor low reference circuit. Sensor Supply Voltage Circuit and Sensor Low Reference Circuit	X	X	X	X Flashes in the following sequence: 1. Amber Outside 2. Amber Outside and Amber Middle 3. Amber Middle and Red Outside 4. Red Outside
9	IMPORTANT: This diagnostic pattern sets for a short to ground in the sensor supply voltage circuit.	X	X	X	-

#	Sensor Supply Voltage Circuit	Amber	Amber	Red			
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DIAGNOSTIC TROUBLE CODE (DTC) CLEARING

The rear parking assist diagnostic sequences may be cleared in one of the following ways:

Vehicle Moving

IMPORTANT: The sequences will not clear if the rear parking assist diagnostic connector is grounded.

1. Drive the vehicle forward at least 24 km/h (15 mph).
2. Stop the vehicle.
3. Turn the ignition OFF.

Vehicle Stopped

IMPORTANT: The sequences will not clear if the rear parking assist diagnostic connector is grounded.

1. Turn the ignition ON.
2. Place foot on the brake.
3. Shift the vehicle into REVERSE within five seconds.
4. Turn the ignition OFF.

SYMPTOMS - ULTRASONIC REAR PARKING ASSIST

IMPORTANT: Review the system operation in order to familiarize yourself with the system functions. Refer to Object Detection Description and Operation.

Visual/Physical Inspection

- Inspect for aftermarket devices which could affect the operation of the system. Refer to **Checking Aftermarket Accessories**.
- Inspect the easily accessible or visible system components for obvious damage or conditions which could cause the symptom.
- Make sure the rear parking assist sensors located on the vehicle rear bumper are clear. Remove any snow, mud or ice that is blocking the sensors.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections**.

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

- **Rear Parking Assist Malfunction**
- **Rear Parking Assist Inoperative - Red Indicator Flashes**

REAR PARKING ASSIST MALFUNCTION

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The object alarm system monitors the distance and how close a vehicle is to an object when backing up in a parking maneuver. The object alarm system will notify the driver of any objects of interest when backing up at speeds less than 5 km/h (3 mph). The distance between a vehicle and an object of interest is monitored by the 4 ultrasonic sensors located in the rear bumpers of the vehicle. The object sensors receive the echo signals reflected off an object of interest while the vehicle is backing up at speeds less than 5 km/h (3 mph). The rear object sensor control module receives the vehicle speed input from the engine control module (ECM) via the vehicle speed signal circuit. When the backing up speed exceeds 5 km/h (3 mph), the rear parking aid (RPA) system is disabled. The object detection system uses visual displays and audible warnings from the radio speakers to warn the driver of an object of interest within the defined field of view. The body control module (BCM) controls the RPA chime function via the chime control circuit and sends serial data request to the radio to activate the chime as needed. The visual RPA display comprises of two amber and one red indicators and these indicators illuminate based on the vehicle distance to the object of interest. When the RPA system is activated, the RPA display first performs a bulb check before any normal operation. The object sensor is a three wire sensor comprising of the supply voltage circuit, signal circuit and the low reference circuit. Power and ground is provided to the object sensors from the rear object sensor control module via the object sensor supply voltage circuit and low reference circuit. The typical object sensor signal circuit voltage when the system is active is between 7.2 V-9.2 V. The object detection system is initiated when the rear object sensor control module receives the transmission reverse input from the BCM via the backup lamp supply voltage circuit.

Diagnostic Aids

- The RPA system is equipped with an on-board diagnostic display feature capable of displaying diagnostic trouble codes from the RPA display. Before using this diagnostics, it is necessary to get familiar and understand how the on-board diagnostic feature operates. Refer to **Diagnostic Trouble Code (DTC) Displaying** and to **Diagnostic Trouble Code (DTC) Clearing** on how the diagnostic trouble codes are displayed and cleared from the RPA display system.
- Make sure the rear park assist (RPA) object sensors located on the vehicle rear bumper are clean and clear. Remove any objects that is blocking the sensors.
- Inspect for after market devices which could affect the operation of the RPA system.

Reference Information

Schematic Reference

Object Detection Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Object Detection Description and Operation

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**

- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Control Module References for Scan Tool Information.

Circuit/System Verification

Ignition ON, Transmission in reverse, block each of the object detect sensors on at a time. The appropriate display should illuminate indicating the object has been detected.

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the rear object sensor control module.
2. Test for less than 1.0 ohm of resistance between the ground circuit terminal 12 and ground.
 - o If greater than the specified value, test the ground circuit for an open/high resistance.
3. Ignition ON, verify that a test lamp illuminates when connected between the ignition 1 voltage circuit terminal 13 and ground.
 - o If the test lamp does not illuminate, test the ignition 1 voltage circuit for a short to ground or an open/high resistance.
4. Ignition ON, transmission in reverse, verify that a test lamp illuminates when connected between the backup lamp supply voltage circuit terminal 15 and ground.
 - o If the test lamp does not illuminate, test the backup lamp supply voltage circuit for a short to ground or an open/high resistance. If circuit tests normal replace the BCM.
5. Start the engine, scan tool installed, with the vehicle drive wheels raised and the vehicle placed in drive or 1st gear. Verify that the speedometer value does not match the scan tool Vehicle Speed parameter in the ECM Engine Data List.
 - o If the speedometer matches the scan tool Vehicle Speed parameter, test the vehicle speed signal circuit terminal 18 for a short to voltage, a short to ground or an open/high resistance. If the circuit tests normal, replace the ECM.
6. Ignition OFF, connect the harness connector at the Rear Object Sensor Control Module.
7. Disconnect the harness connector at the Rear Parking Assist Display.
8. Ignition ON, verify a test lamp illuminates between the telltale assembly supply voltage circuit terminal A and ground.
 - o If the test lamp does not illuminate, test the circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the Rear Object Sensor Control Module.
9. Ignition OFF, disconnect the harness connector at the Rear Object Sensor Control Module.
10. Connect the harness connector at the Rear Parking Assist Display.
11. Connect a 3A fused jumper wire between the telltale assembly supply voltage circuit terminal 23 and B+.
12. Ignition ON, connect a jumper wire between the following telltale assembly indicator control circuits and ground. When the telltale circuit is jumpered to ground, the indicator should illuminate.
 - Telltale assembly indicator control circuit terminal 24
 - Telltale assembly indicator control circuit terminal 25
 - Telltale assembly indicator control circuit terminal 26
 - o If any of the indicators do not illuminate, test the control circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the RPA display.
13. If all circuits tests normal, replace the rear object sensor control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Information Center Telltale Assembly Replacement**
- **Control Module References** for the object sensor control module, ECM or BCM replacement, setup, and programming

REAR PARKING ASSIST INOPERATIVE - RED INDICATOR FLASHES

Diagnostic Instructions

- Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.
- Review **Strategy Based Diagnosis** for an overview of the diagnostic approach.
- **Diagnostic Procedure Instructions** provides an overview of each diagnostic category.

Circuit/System Description

The object alarm system monitors the distance and how close a vehicle is to an object when backing up in a parking maneuver. The object alarm system will notify the driver of any objects of interest when backing up at speeds less than 5 km/h (3 mph). The distance between a vehicle and an object of interest is monitored by the 4 ultrasonic sensors located in the rear bumpers of the vehicle. The object sensors receive the echo signals reflected off an object of interest while the vehicle is backing up at speeds less than 5 km/h (3 mph). The rear object sensor control module receives the vehicle speed input from the ECM via the vehicle speed signal circuit. When the backing up speed exceeds 5 km/h (3 mph), the rear parking assist (RPA) system is disabled. The object detection system uses visual displays and audible warnings from the radio speakers to warn the driver of an object of interest within the defined field of view. The BCM controls the RPA chime function via the chime control circuit and sends serial data request to the radio to activate the chime as needed. The visual RPA display comprises of two amber and one red indicators. These indicators illuminate based on the vehicle distance to the object of interest. When the RPA system is activated, the RPA display first performs a bulb check before any normal operation. The object sensor is a three wire sensor comprising of the supply voltage circuit, signal circuit and the low reference circuit. Power and ground is provided to the object sensors from the rear object sensor control module via the object sensor supply voltage circuit and low reference circuit. The typical object sensor signal circuit voltage when the system is active is between 7.2-9.2V. The object detection system is initiated when the rear object sensor control module receives the transmission reverse input from the BCM via the backup lamp supply voltage circuit.

Diagnostic Aids

- The RPA system is equipped with an on-board diagnostic display feature capable of displaying diagnostic trouble codes from the RPA display. Before using this diagnostics, it is necessary to get familiar and understand how the on-board diagnostic feature operates. Refer to **Diagnostic Trouble Code (DTC) Displaying** and to **Diagnostic Trouble Code (DTC) Clearing** on how the diagnostic trouble codes are displayed and cleared from the RPA display system.
- Make sure the rear park assist (RPA) object sensors located on the vehicle rear bumper are clean and clear. Remove any objects that is blocking the sensors.
- Inspect for after market devices which could affect the operation of the RPA system.

Reference Information

Schematic Reference

Object Detection Schematics

Connector End View Reference

Component Connector End Views

Description and Operation

Object Detection Description and Operation

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Control Module References for Scan Tool Information.

Circuit/System Verification

The Diagnostic Indicator Pattern 1 is a confirmation that the object alarm system has successfully entered the diagnostic mode. If the Diagnostic Indicator Pattern 1 does not display after an attempt to enter the diagnostic mode, it may be as a result of not entering the system diagnostic mode successfully or an RPA diagnostic input circuit fault is present. After the Diagnostic Indicator Pattern 1 is displayed, observe the RPA display for the next Diagnostic Indicator Pattern displayed. The indicator pattern displayed after the Diagnostic Indicator Pattern 1 is the diagnostic indicator pattern that actually needs be diagnosed. Proceed to the appropriate Diagnostic Pattern in this table. Refer to **Diagnostic Trouble Code (DTC) Displaying**.

Circuit/System Testing

Diagnostic Indicator Pattern 1

1. Enter the diagnostic mode. Refer to **Diagnostic Trouble Code (DTC) Displaying**.
2. Verify that the Diagnostic Indicator Pattern 1 does not display as shown in the diagnostic indicator list. Refer to **Diagnostic Trouble Code (DTC) Displaying**.
 - If the Diagnostic Indicator Pattern 1 displays after entering the diagnostic mode, proceed to the next Diagnostic Indicator Pattern displayed.
- If the Diagnostic Indicator Pattern 1 does not display after successfully entering the diagnostic mode, test the rear park assist diagnostic input circuit terminal 16 for a short to voltage or an open/high resistance. If the circuit tests normal, test or replace the rear object sensor control module.

Diagnostic Indicator Pattern 2, 3, 4 and 5

1. Ignition OFF, disconnect the harness connector at the suspect rear object sensor.
2. Test for less than 1 ohm between the low reference circuit terminal 2 and ground.
 - If greater than the specified range, test the low reference circuit for an open/high resistance.
3. Ignition ON, with the transmission in reverse, test for 8.2-8.8V between the supply voltage circuit terminal 3 and the low reference circuit terminal 2.
 - If less than the specified range, test the supply voltage circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the rear object sensor control module.
 - If greater than the specified range, test the supply voltage circuit for a short to battery. If all circuit tests normal, replace the rear object sensor control module.
4. Ignition ON, with the transmission in reverse, test for 7.2-9.2V between the signal circuit terminal 1 and the

object sensor low reference circuit terminal 2.

- If less than the specified range, test the signal circuit for a short to ground or an open/high resistance. If the circuit tests normal, replace the rear object sensor control module.
- If greater than the specified range, test the signal circuit for a short to battery. If all circuit tests normal, replace the rear object sensor control module.

5. If all circuits test normal, test or replace the suspect rear object sensors.

Diagnostic Indicator Pattern 6

1. Ignition OFF, disconnect the harness connector at the rear object sensor control module.
2. Ignition ON, test for 9.5V between the chime control circuit terminal 22 and ground.
 - If less than the specified value, test the chime control circuit for a short to ground or an open/high resistance. If all circuits test normal, replace the BCM.
 - If greater than the specified value, refer to **Speakers Inoperative - One or More**.

Diagnostic Indicator Pattern 7

IMPORTANT: When entering the diagnostic mode, it is necessary to follow the instructions as indicated. Refer to **Diagnostic Trouble Code (DTC) Displaying**. If the vehicle is not shifted into reverse within 5 seconds after turning the ignition ON, the diagnostic mode will still be initiated but a reverse input wiring fault will be registered as Diagnostic Indicator Pattern 7 as shown in the indicator list.

Verify that the Diagnostic Indicator Pattern 7 displays as shown in diagnostic indicator list.

- If the diagnostic indicator pattern 7 is displayed, refer to **Diagnostic Trouble Code (DTC) Displaying** and to **Diagnostic Trouble Code (DTC) Clearing**.

Diagnostic Indicator Pattern 8 and 9

IMPORTANT: Diagnostic indicator patterns 8 or 9 are displayed in sequence of diagnostic indicator patterns 2, 3, 4 and 5.

1. While still in the diagnostic mode, disconnect the rear object sensors one at a time and verify that the indicator pattern 8 or 9 does not display after the suspect sensors has been disconnected. When the suspect sensors is disconnected, the indicator pattern 8 or 9 should no longer be displayed.
 - If the indicator pattern 8 or 9 continues to display after each sensor has been disconnected and reconnected, test the object sensor supply voltage circuit and the low reference circuit for a short to ground or an open/high resistance. If circuit tests normal, replace the rear object sensor control module.
 - If the indicator pattern 8 and 9 does not display after disconnecting the suspect sensor, replace the suspect sensor.
2. If all circuits test normal, replace the object sensor control module.

Repair Procedures

Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Rear Object Sensor Replacement**
- **Control Module References** for the object sensor control module replacement, setup, and programming

REPAIR INSTRUCTIONS

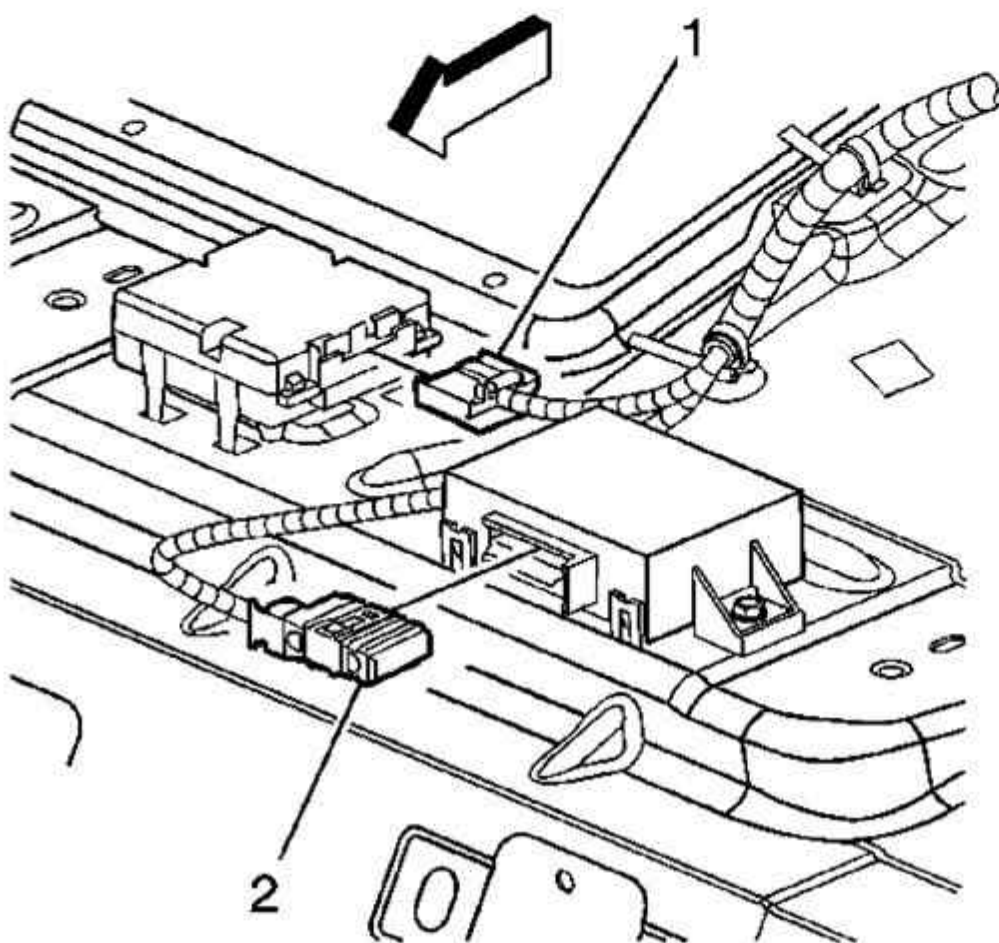
OBJECT ALARM MODULE REPLACEMENT**Removal Procedure**

Fig. 2: Locating Rear Parking Assist (RPA) Receiver
Courtesy of GENERAL MOTORS CORP.

1. Remove the rear window shelf trim panel. Refer to **Rear Window Shelf Trim Panel Replacement**.
2. Disconnect the rear parking assist (RPA) receiver electrical connector (2).

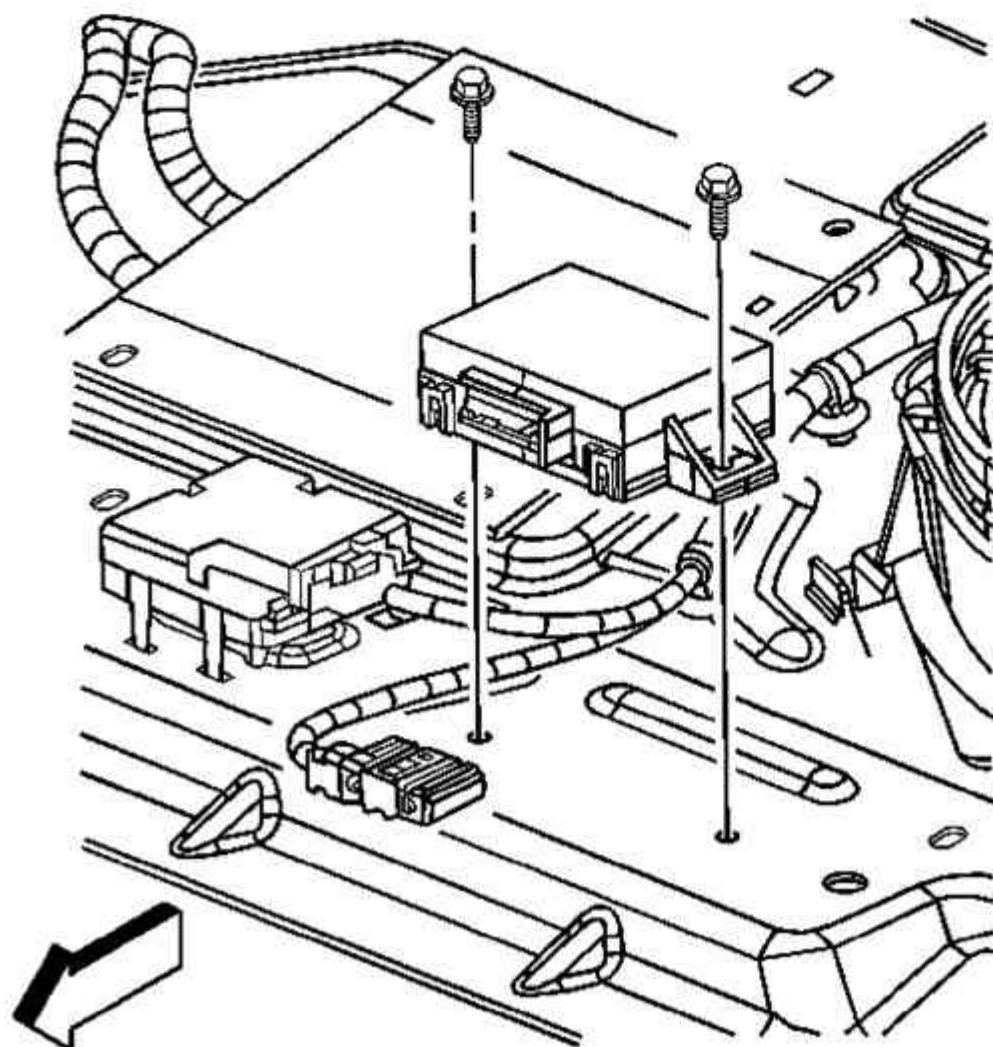


Fig. 3: Identifying RPA Receiver & Fasteners
Courtesy of GENERAL MOTORS CORP.

3. Remove the fasteners from the RPA receiver.
4. Remove the receiver from the rear shelf.

Installation Procedure

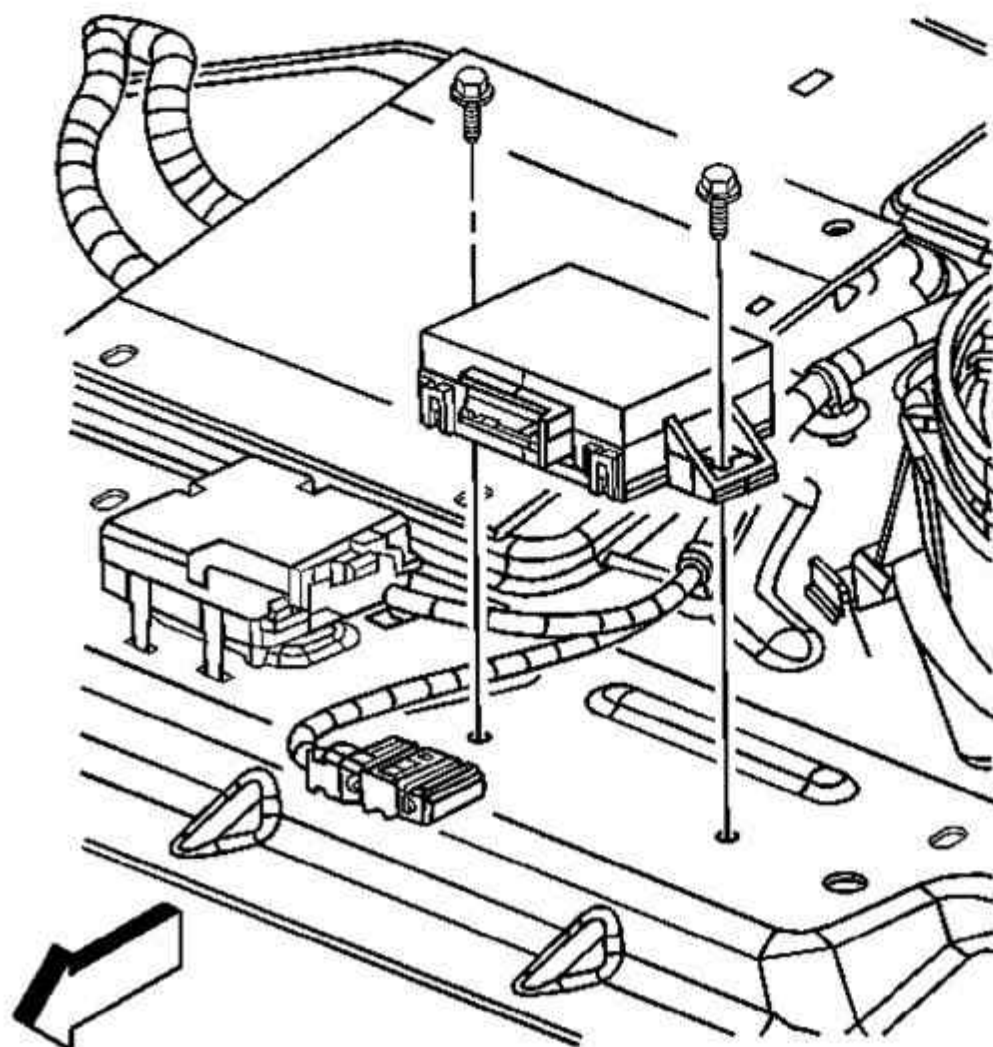


Fig. 4: Identifying RPA Receiver & Fasteners
Courtesy of GENERAL MOTORS CORP.

1. Install the RPA receiver to the rear window shelf.
2. Install the RPA receiver fastener.

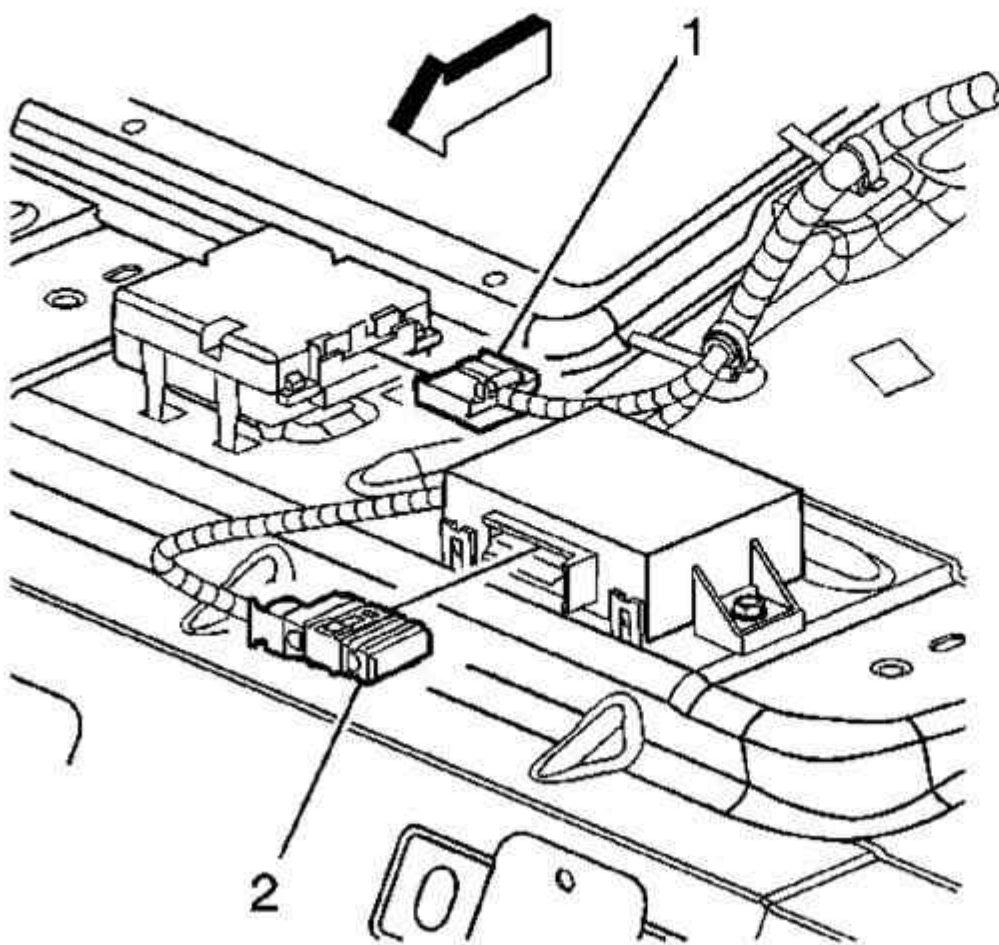


Fig. 5: Locating Rear Parking Assist (RPA) Receiver
Courtesy of GENERAL MOTORS CORP.

3. Connect the electrical connector (2) to the RPA receiver.
4. Install the rear window shelf trim panel. Refer to **Rear Window Shelf Trim Panel Replacement**.
5. Refer to **Control Module References** for programming and setup information.

INFORMATION CENTER TELLTALE ASSEMBLY REPLACEMENT

Removal Procedure

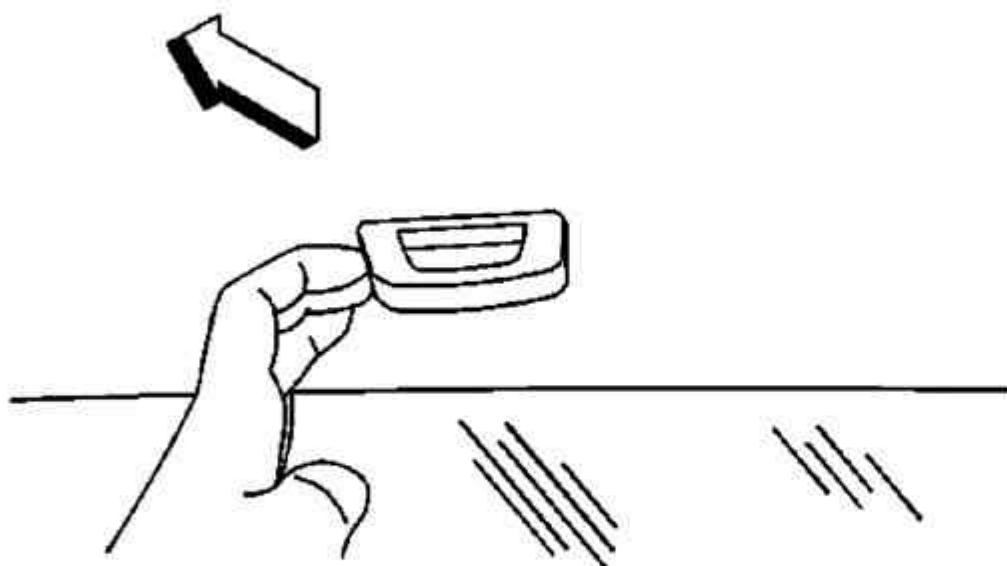


Fig. 6: View Of Information Center Telltale Assembly Bezel
Courtesy of GENERAL MOTORS CORP.

1. Position your fingers between the headliner and the information center telltale assembly bezel and gently pull down to release the display bezel retainers.

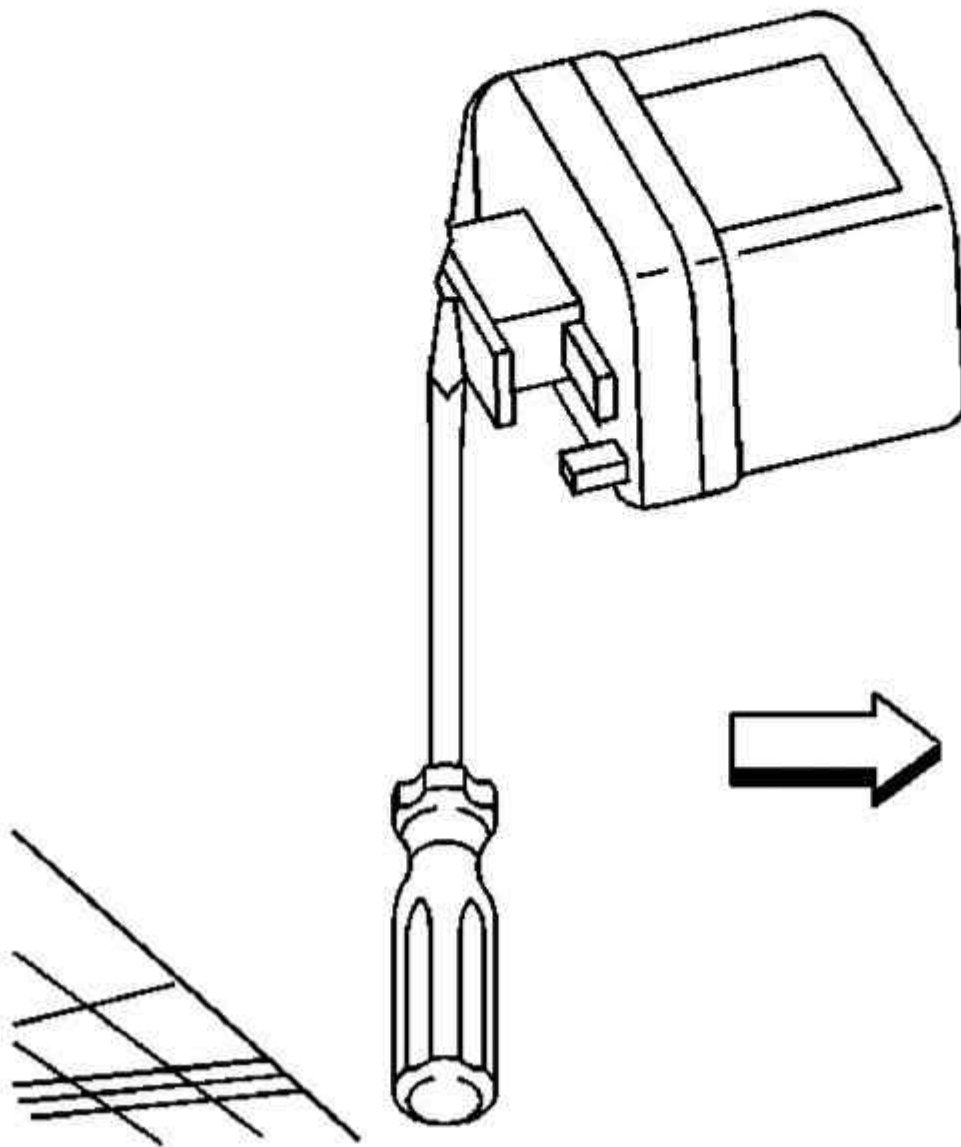


Fig. 7: View Of Screwdriver & Locking Tab Of Telltale Assembly
Courtesy of GENERAL MOTORS CORP.

2. Use a small flat-bladed tool to release the locking tab at the rear of the telltale assembly.

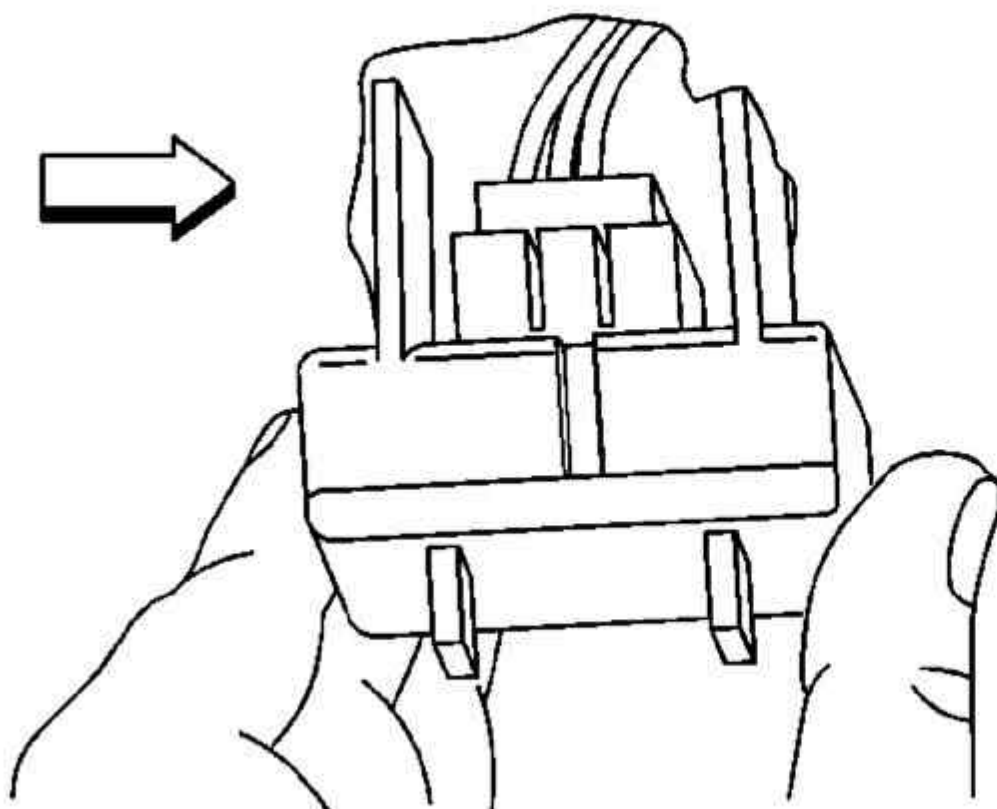


Fig. 8: View Of Information Center Telltale Assembly
Courtesy of GENERAL MOTORS CORP.

3. Tilt the information center telltale assembly down and pull down to remove.
4. Disconnect the electrical connector from the information center telltale assembly.

Installation Procedure

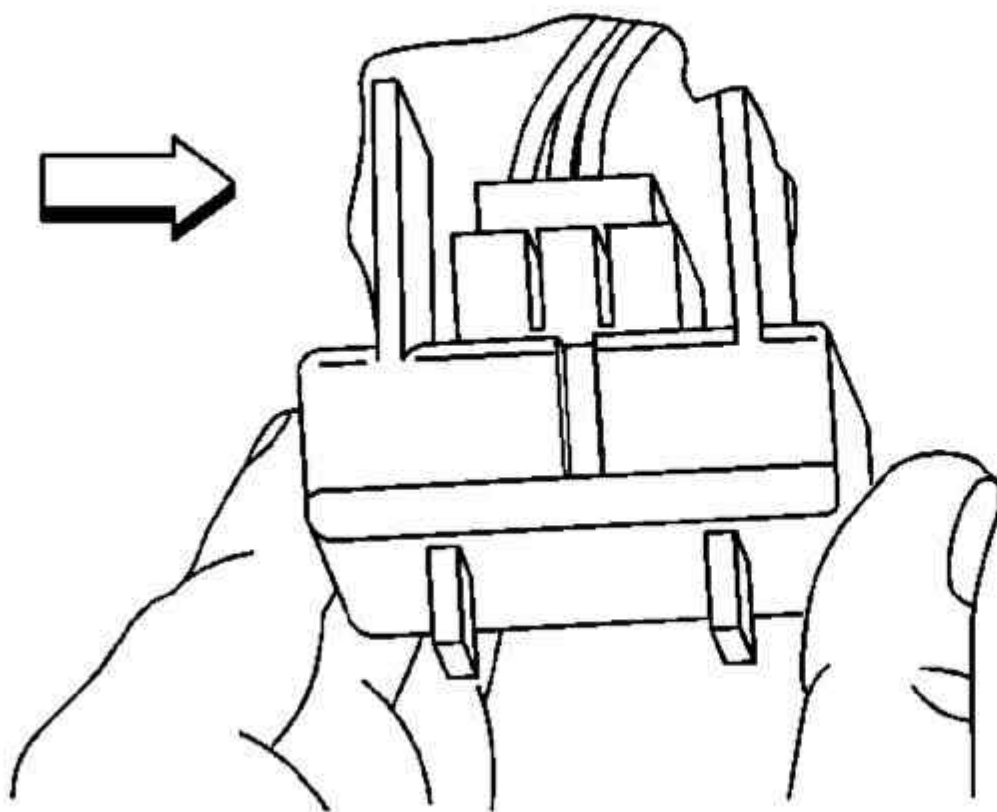


Fig. 9: View Of Information Center Telltale Assembly
Courtesy of GENERAL MOTORS CORP.

1. Connect the electrical connector to the information center telltale assembly.
2. Position the information center telltale assembly into the headliner until locking tab locks into position. It may be necessary to rock the display into position.
3. Install bezel by pressing into place until the locking tabs are fully seated.

REAR OBJECT SENSOR REPLACEMENT

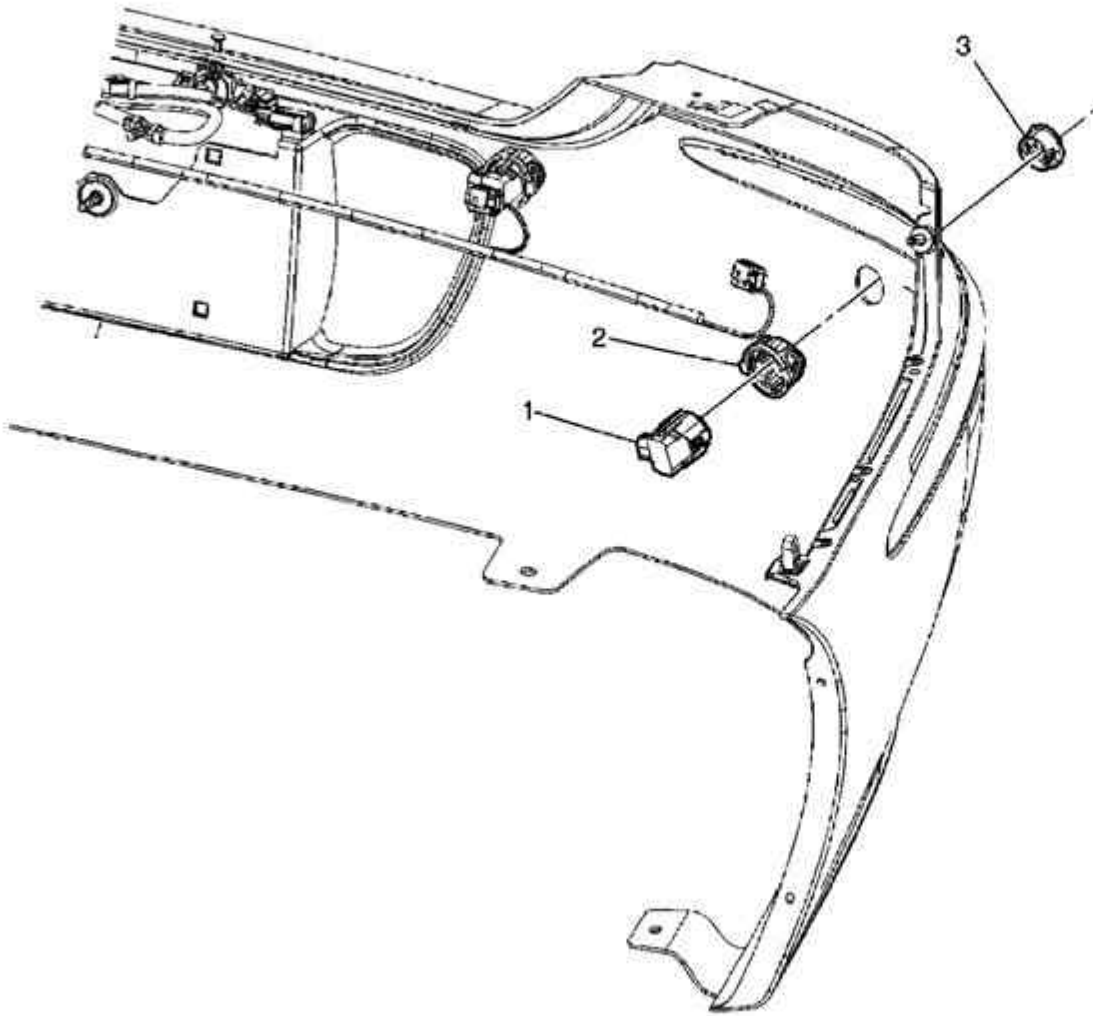


Fig. 10: Identifying Rear Object Sensor
 Courtesy of GENERAL MOTORS CORP.

Callout	Component Name
Preliminary Procedures: Remove rear fascia. Refer to Rear Bumper Fascia Replacement .	
1	Rear Object Sensor Tip: • Do not refinish previously painted sensors. • Press tab to release the sensor from the retainer. • Disconnect the electrical connector. • Paint the new rear object sensor. Refer to Basecoat/Clearcoat Paint Systems . • Using a paint thickness gage suitable for non-ferrous metals, ensure paint thickness does not exceed 6 mils. Refer to Paint Gages .
2	Rear Object Retainer
3	Rear Object Retainer

DESCRIPTION AND OPERATION

OBJECT DETECTION DESCRIPTION AND OPERATION

The object alarm system monitors the distance and how close a vehicle is to an object when backing up in a parking maneuver. The object alarm system will notify the driver of any objects of interest when backing up at speeds less than 5 km/h (3 mph). The distance between a vehicle and an object of interest is monitored by the 4 ultrasonic sensors located in the rear bumpers of the vehicle. The object sensors receive the echo signals reflected off an

object of interest while the vehicle is backing up at speeds less than 5 km/h (3 mph). The rear object sensor control module receives the vehicle speed input from the ECM via the vehicle speed signal circuit. When the backing up speed exceeds 5 km/h (3 mph), the rear parking aid (RPA) system is disabled. The object detection system uses visual displays and audible warnings from the radio speakers to warn the driver of an object of interest within the defined field of view. The BCM controls the RPA chime function via the chime control circuit and will send serial data request to the radio to sound the chime as needed. The visual RPA display comprises of two amber and one red indicators and these indicators illuminate based on the vehicle distance to the object of interest. When the RPA system is activated the RPA display first performs a bulb check before any normal operation. The object sensor is a three wire sensor comprising of the supply voltage circuit, signal circuit and the low reference circuit. Power and ground is provided to the object sensors from the rear object sensor control module via the object sensor supply voltage circuit and low reference circuit. The typical object sensor signal circuit voltage when the system is active is between 7.2 V-9.2 V. The object detection system is initiated when the rear object sensor control module receives the transmission reverse input from the BCM via the backup lamp supply voltage circuit.

When the ignition is ON and the vehicle is placed into reverse, the URPA performs a bulb check. During the bulb check, the 3 indicators on the display illuminate for approximately 2 seconds to indicate that the system is working. The URPA performs a bulb check and operates when the following conditions are present:

- The ignition is ON.
- The vehicle is placed in REVERSE (R).
- The vehicle speed is less than 5 km/h (3 mph).

At speeds greater than 5 km/h (3 mph), the URPA is disable. The red indicator flashes to warn the driver that the URPA is disabled.

The URPA senses how close the vehicle is to an object. The distance is determined by the 4 ultrasonic sensors located on the rear bumper. When the system detects an object, one of the following will occur:

- If the object is less than 0.3 m (11 in) away from the rear of the vehicle, the amber outside, amber middle, and the red outside indicators flash and the chime sounds continuously.
- If the object is less than 0.3-0.5 m (11-20 in) away from the rear of the vehicle, the amber outside, amber middle, and the red outside indicators are on and the chime sounds continuously.
- If the object is 0.5-1.0 m (20-40 in) away from the rear of the vehicle, the amber outside, and the amber middle indicators are on.
- If the object is 1.0-1.5 m (40-60 in) away from the rear of the vehicle, the amber outside indicator is on and the chime sounds one time on the first detection of an object.

The URPA can detect objects 7.6 cm (3 in) wide and at least 25.4 cm (10 in) tall. It cannot detect objects above the level of the roof.

If the red indicator flashes continuously, the on-board diagnostic needs to be entered to determine if a malfunction is present. Refer to **Diagnostic Trouble Code (DTC) Displaying**.

2008 Buick LaCrosse CXL
2008 ACCESSORIES & EQUIPMENT Object Detection - LaCrosse

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